

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property  
Organization  
International Bureau



(43) International Publication Date  
10 March 2005 (10.03.2005)

PCT

(10) International Publication Number  
**WO 2005/021470 A3**

(51) International Patent Classification<sup>7</sup>: C07C 51/48,  
59/01, 57/04

(21) International Application Number:  
PCT/US2004/023028

(22) International Filing Date: 25 June 2004 (25.06.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
60/482,738 26 June 2003 (26.06.2003) US

(71) Applicant (for all designated States except US):  
**CARGILL, INCORPORATED** [US/US]; Law 24,  
15407 McGinty Road West, Wayzata, MN 55391 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **MENG, Xiangsheng**  
[US/US]; 417 Santa Fe Trail, Chanhassen, MN 55317 (US).  
**TSOBANAKIS, Paris** [GR/US]; 8579 Birch Boulevard,  
Inver Grove Heights, MN 55076 (US). **ABRAHAM, Tim-**  
**othy** [US/US]; 18507 Apple Tree Court, Minnetonka, MN  
55345 (US).

(74) Agents: **PRIBNOW, Scott et al.**; Cargill, Incorporated,  
Law 24, 15407 McGinty Road West, Wayzata, MN 55391  
(US).

(81) Designated States (unless otherwise indicated, for every  
kind of national protection available): AE, AG, AL, AM,  
AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN,  
CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI,  
GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE,  
KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD,  
MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG,  
PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM,  
TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM,  
ZW.

(84) Designated States (unless otherwise indicated, for every  
kind of regional protection available): ARIPO (BW, GH,  
GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM,  
ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),  
European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI,  
FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI,  
SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ,  
GW, ML, MR, NE, SN, TD, TG).

**Published:**

- with international search report
- before the expiration of the time limit for amending the  
claims and to be republished in the event of receipt of  
amendments

(88) Date of publication of the international search report:  
12 May 2005

For two-letter codes and other abbreviations, refer to the "Guid-  
ance Notes on Codes and Abbreviations" appearing at the begin-  
ning of each regular issue of the PCT Gazette.

(54) Title: PROCESS FOR SEPARATING AND RECOVERING 3-HYDROXYPROPIONIC ACID AND ACRYLIC ACID

(57) Abstract: Disclosed is a process for separating and recovering 3-hydroxypropionic acid from an aqueous solution comprising 3-hydroxypropionic acid and acrylic acid, comprising contacting the aqueous solution with an organic extractant, other than ethyl acetate. Also disclosed are processes for separating acrylic acid from aqueous solutions comprising acrylic acid and an organic extractant involving back extraction with water, or distillation in the presence of water. Further disclosed is a process for separating and recovering 3-hydroxypropionic acid and acrylic acid from an aqueous solution comprising 3-hydroxypropionic acid and acrylic acid.

WO 2005/021470 A3

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property  
Organization  
International Bureau



(43) International Publication Date  
10 March 2005 (10.03.2005)

PCT

(10) International Publication Number  
**WO 2005/021470 A2**

(51) International Patent Classification<sup>7</sup>: **C07C 5/00**

(21) International Application Number:  
PCT/US2004/023028

(22) International Filing Date: 25 June 2004 (25.06.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
60/482,738 26 June 2003 (26.06.2003) US

(71) Applicant (for all designated States except US):  
**CARGILL, INCORPORATED** [US/US]; Law 24,  
15407 McGinty Road West, Wayzata, MN 55391 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **MENG, Xiangsheng**  
[US/US]; 417 Santa Fe Trail, Chanhassen, MN 55317 (US).  
**TSOBANAKIS, Paris** [GR/US]; 8579 Birch Boulevard,  
Inver Grove Heights, MN 55076 (US). **ABRAHAM, Timothy**  
[US/US]; 18507 Apple Tree Court, Minnetonka, MN  
55345 (US).

(74) Agents: **PRIBNOW, Scott et al.**; Cargill, Incorporated,  
Law 24, 15407 McGinty Road West, Wayzata, MN 55391  
(US).

(81) Designated States (unless otherwise indicated, for every  
kind of national protection available): AE, AG, AL, AM,  
AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN,  
CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI,  
GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE,  
KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD,  
MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG,  
PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM,  
TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM,  
ZW.

(84) Designated States (unless otherwise indicated, for every  
kind of regional protection available): ARIPO (BW, GH,  
GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM,  
ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),  
European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI,  
FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI,  
SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ,  
GW, ML, MR, NE, SN, TD, TG).

**Published:**

— without international search report and to be republished  
upon receipt of that report

For two-letter codes and other abbreviations, refer to the "Guid-  
ance Notes on Codes and Abbreviations" appearing at the begin-  
ning of each regular issue of the PCT Gazette.

(54) Title: PROCESS FOR SEPARATING AND RECOVERING 3-HYDROXYPROPIONIC ACID AND ACRYLIC ACID

(57) Abstract: Disclosed is a process for separating and recovering 3-hydroxypropionic acid from an aqueous solution comprising 3-hydroxypropionic acid and acrylic acid, comprising contacting the aqueous solution with an organic extractant, other than ethyl acetate. Also disclosed are processes for separating acrylic acid from aqueous solutions comprising acrylic acid and an organic extractant involving back extraction with water, or distillation in the presence of water. Further disclosed is a process for separating and recovering 3-hydroxypropionic acid and acrylic acid from an aqueous solution comprising 3-hydroxypropionic acid and acrylic acid.

WO 2005/021470 A2